REMARKS

A few minor changes were made voluntarily in claims 1 and 2 to improve the form of the claims. In general, every claim that used "media" for the transmission medium has been changed to use "medium" which is the correct word according to dictionaries.

Claim 1 was also voluntarily amended to add an input for receiving a transmit frame timing delay value shown as 415 in Figure 1 to cover the group of species wherein the ranging process or other conventional process to achieve frame synchronization or minislot boundary alignment is carried out externally to the SCDMA multiplexer/modulator 54 in Figure 1. The claim has been amended to indicate that the SCDMA multiplexer/modulator 54 may optionally have this ranging or minislot alignment circuitry incorporated therein or the ranging or minislot alignment circuitry may be external and simply feed the proper delay value to the SCDMA multiplexer/modulator 54 to achieve frame synchronization or minislot alignment.

Claim 3 was voluntarily amended to correct an error in the recitation of cooperation between elements. This claim is supposed to cover the headend transmitter of Figure 2. Claim 4 was amended slightly to supply some missing links between elements and to improve the form of the claim. Some amendments were made to claim 4 to remove an ambiguous limitation that made it sound like the upstream modulator/multiplexer (107 in Figure 2) had to be capable of performing all of TDMA, SCDMA and CDMA multiplexing when it only really needs to be able to perform one or more of these forms of multiplexing. This amendment was:

> an upstream modulator/multiplexer which is capable of <u>performing one</u>

A

or more forms of multiplexing including TDMA or SCDMA or CDMA [multiplexing]

Claim 4 was also voluntarily amended to add an input for receiving a transmit frame timing delay value shown as 415 in Figure 2 to cover the group of species wherein the ranging process or other conventional process to achieve frame synchronization or minislot boundary alignment is carried out externally to the upstream multiplexer/modulator 107 in Figure 2. The claim has been amended to indicate that the upstream multiplexer/modulator 107 may optionally have this ranging or minislot alignment circuitry incorporated therein or the ranging or minislot alignment circuitry may be external and simply feed the proper delay value to the upstream multiplexer/modulator 107 to achieve frame synchronization or minislot alignment.

Claim 5 was voluntarily amended to correct a spelling error and to correct a couple of antecedent basis problems noticed by the undersigned. Claim 5 was also voluntarily amended to add limitations regarding what was done with the upstream carrier generated in the first node and to straighten out the language regarding demultiplexing.

Claims 6-17 were rejected as anticipated by Bingham et al. (U.S. 5,838,667). Bingham et al. teach an ADSL time division multiplexed system wherein downstream transmissions are in different timeslots that upstream transmissions so that both upstream and downstream transmissions do not occur simultaneously as in new claim 32. To avoid crosstalk, Bingham et al. time division duplex upstream communication times and downstream communications times so that they do not overlap. To prevent crosstalk caused by two different pairs of transmission lines in the same binder having different upstream and downstream timeslot boundaries, a synchronization scheme is

A

taught. Generally, all downstream transmitters coupled to ADSL lines in the same binder time their downstream transmissions to a master clock in the central office or distribution unit. The downstream clock is recovered by each remote unit coupled to an ADSL line in the same binder and is used to generate an upstream clock at the same frequency as the downstream clock. This upstream clock is used to synchronize all upstream transmissions so they theoretically occur at the same time. The specific teaching of this is at Col. 7, lines 39-44 where Bingham et al. teach:

> The remote units 204 each include a receiver 231... and a controller 235 that captures the superframe, symbol and sample clocks from the downstream signals and synchronize the upstream signals **therewith** utilizing any one of a variety of clock recovery....

Thus, it is clear that the upstream clocks used are the recovered downstream clocks and are at the same frequency. This is not the same invention as is claimed because the invention is able to successfully function in environments where the downstream clock is not at the right frequency for the upstream transmitters and receivers.

There is no indication of how the different propagation delays from different remote transmitters are accounted for unless it it assumed that all propagation delay differences are absorbed by the quiet times so that there is no overlap between any upstream timeslot and a downstream timeslot.

Claim 6 has been amended so as to not be anticipated by the Bingham et al. reference because it contains the following limitation not taught in the Bingham et al. reference:

> means for generating upstream and downstream clock signals which are phase coherent with said master clock signal, said upstream clock signal

A

having a frequency which is M/N times the frequency of said downstream clock signal, where M and N are integers and are not equal;

Because the upstream clock is now specified to be at a different frequency than the recovered downstream clock but phase coherent therewith, synchronization can be maintained in the system, but the invention can be used in systems such as MCNS where the downstream clock is not at the right frequency for the upstream form of multiplexing being used. Thus, claim 6 is not anticipated by Bingham et al.

The other changes to claim 6 are made voluntarily to improve its clarity and specificity.

Claim 7 has been amended so as to not be anticipated by the Bingham et al reference because it contains the following limitation not taught in the Bingham et al. reference:

said upstream clock having a frequency which is M/N times the frequency of said downstream clock, where M and N are integers and are not equal;

Because the upstream clock is now specified to be at a different frequency than the recovered downstream clock but phase coherent therewith, synchronization can be maintained in the system, but the invention can be used in systems such as MCNS where the downstream clock is not at the right frequency for the upstream form of multiplexing being used. Thus, claim 7 is not anticipated by Bingham et al.

A new claim 32 has been added which is similar to Claim 7 but which is amended to add more specificity of the functions stated for each element by adding limitations. For example, limitations were added that specifically recite that an upstream carrier in a different, non-interfering frequency band from the frequency of the recovered downstream carrier. This upstream carrier is generated from the upstream clock which

A

is generated from the recovered downstream clock which is phase coherent with the headend master clock. Limitations were also added to specify that the upstream data transmission is simultaneous with the recovery of downstream data. It is at least this limitation along with the fact that the upstream clock generated from the recovered downstream clock is not at the same frequency as the downstream clock which are not anticipated by the Bingham et al. reference.

A new claim 33 was added that is similar to claim 6 but which adds limitations that specify that the upstream and downstream clocks are used to generate upstream and downstream carriers that are used to recover upstream data and transmit downstream data respectively. Claim 33 also specifically recites that preamble data transmitted by each remote unit transmitter is also used to recover the upstream data. This limitation is inherently in claim 6 by operation of 112, Paragraph 6 and the teachings in the specification.

Claims 8-12 were rejected as anticipated, but they depend from claims 6 and 7 are are therefore not anticipated for the same reasons pointed out above for claims 6 and 7.

Claim 13 was also rejected as anticipated. Claim 13 was voluntarily amended to make a few minor corrections in spelling and word choice and to add the functional statement that the first means uses the recovered downstream clock to generate a downstream carrier of the same frequency and phase coherent with the downstream carrier used by the headend to transmit downstream data. In response to the anticipation rejection, the clock element was amended to include the following limitation:

> and having a different frequency than said recovered downstream clock and related to the frequency of said downstream clock by the relationship

M/N * F_{ds} where F_{ds} is the frequency of said recovered downstream clock and M and N are integers which are not equal;

Thus, the upstream clock is phase coherent with the recovered downstream clock by at M/N times its frequency where M and N or not equal integers. This is different than is disclosed in Bingham et al.

Claims 14-17 depend from 13 and therefore their anticipation rejections are rendered moot. Claims 16 and 17 were voluntarily amended to correct an incorrect word choice.

Claim 18 was voluntarily amended to specify that the upstream clock is generated from the downstream clock so as to be phase coherent with the master clock in the headend. This is necessary because the headend sends minislot assignments down to the remote transmitters when they can release their data so the remotes must be synchronized with the headend so that they transmit their data upstream during the proper minislots. The claim was also voluntarily amended to clarify the nature of the offset and to remove an ambiguity in the original language which made it sound like an entire superframe of minislots is actually transmitted by each remote when in fact transmissions are only during assigned minislots and each remote has an offset such that its assigned minislot transmissions arrive at said headend during the assigned minislots as counted by the minislot counter in the headend.

Claim 18 was also voluntarily amended to change the name of the offset value in the ranging means element to RU frame alignment offset value to make sure the claim is properly interpreted.

Claim 18 was also voluntarily amended to change the clock to a clock means to

change the rules of interpretation to 112, Paragraph 6 and to further specify a statement of function that the upstream clock is generated from the recovered downstream clock so as to be phase coherent with a master clock in the headend and have a frequency which is M/N times the frequency of the downstream clock where M and N are integers.

The applicants would like to make it clear that the third means in claim 18 is intended to include all the alternative embodiments for the SCDMA modulator 196 in Figure 4 identified in the specification and the PCT application which is incorporated by reference, and that it includes means to transmit the known preamble data to the CU for use by the CU in generating phase and amplitude correction factors to receive this particular Rus transmissions. This includes species which generate the upstream carrier from the locally generated upstream clock generated from the recovered downstream clock. Those skilled in the art will appreciate that teachings taken from the PCT application incorporated by reference for the specific structure of the upstream transmitter in the RU must be adjusted appropriately to incorporated the phase coherence of the upstream clock to the downstream clock and master clock taught herein even if the upstream and downstream clocks run at different rates.

The applicants would also like to make it clear that the ranging means is intended to include the local kiloframe counter 202, the local kiloframe sampler 208, species both with and without the optional clock slip detector 210 and the sync message detector 189 in Figure 4 and all their interconnections and alternative embodiments identified in the specification and the teachings of Figures 6 and 7 for operation of these circuits in the preferred and alternative embodiments since all these circuits are involved in the stated function of determination of an offset value to achieve frame synchronization.

A

Claims 20 and 21 were voluntarily amended to specify that the RU transmitters also transmit preamble data besides upstream data to make is clear this function is part of the claim because of the ambiguity of interpreting means plus function claims in light of complex specifications such as this one and the peculiarities of the litigation process.

Claim 22 has been voluntarily amended to add the use of preamble data in transmitting and receiving upstream transmissions. Claim 22 has been voluntarily amended to include a ranging means in the sixth means to make sure interpretation of this means plus function element includes some ranging circuitry to achieve frame synchronization.

Claim 23 has been voluntarily amended to specify that the samples of the timestamp counter in the CU are taken at predetermined times. This does not make the claim indefinite because the predetermined times can be ascertained by study of Figure 6 and its explanation. The claim has also been amended to specify exactly what the ranging means of claim 22 must include in the species of claim 23. Upstream was added to specify which superframe the ranging means symbol counter is counting out.

Claim 24 has been voluntarily amended to specify that the ranging means cooperates with the offset calculation means to achieve frame synchronization more quickly.

Claim 25 has been amended to specify the ranging means uses a trial and error delay process to determine the exact offset and there is no offset calculation means.

Claim 29 was rejected for indefiniteness. In response, "node" in line 20 was changed to "modem". A variety of other minor changes were made voluntarily to improve the form of the claim.

The word "minslot" was changed to "minislot" in each of claims 19, 22 and 25

A

in response to a rejection for indefiniteness of claims 22 and 25. Also, a step of achieving frame synchronization was added and a limitation to transmit known preamble data was added to the upstream data transmission step to allow the process to achieve frame synchronization more easily.

New claims 34, 35, 36 and 37 were added to break the process of claim 29 down into the separate processes carried out by the headend modem and the remote unit modem and to specify transmission of downstream timestamp messages to aid in faster ranging in the case of an MCNS type downstream. Claim 34 adds the use of preamble data, a limitation that was not in claim 29, to aid in achieving upstream data recovery without the need to recover each individual clock and carrier transmitted by each remote unit modem.

A new claim 38 was added to claim the ranging process of Figure 7 standing alone.

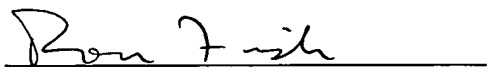
All claims are believed to be in condition for allowance, and favorable action is earnestly solicited.

Dated: August 6, 2000

Respectfully submitted,

Ronald Craig Fish
Reg. No. 28,843
Tel 408 778 3624
FAX 408 776 0426
Ronfpatents@worldnet.att.net

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231
on August 6, 2000
(Date of Deposit)



Ronald Craig Fish, President
Ronald Craig Fish, a Law Corporation
Reg. No. 28,843

A